CELL BIOLOGY LAB

It is now the well identified field of prime interest with technology development towards bioengineering of epidermis and composite skin for various clinical applications as the basic focus of this lab. Because in today's open market economy development of various patentable medical technologies keeping in mind both common man's reach and sustainability in the existing market is very much required. An innovative and cost-effective process of growing human epidermis in vitro has been identified and a patent filed from this lab. The process not only was proven to stimulate the proliferation of epidermal stem cells but could also be extended to other stem cells as well. The preliminary clinical application of the cultured epidermis in burns patients yielded very encouraging results. Currently efforts are on to extend and upgrade the lab towards bringing out a specialized Pharmaceutical-grade GMP facility suitable for the complex long-term culture technique of growing cultured epithelial autografts enabling to undertake larger trials in burns patients.

Additionally, the lab is involved with collaborative technological strategies towards development of simpler but efficient expansion of epidermal keratinocyte stem cells using a novel synthetic hydrogel developed by Japanese scientists. The other focuses of the investigating team are towards understanding the molecular mechanisms underlying the developed techniques.

Name of Incharge : LAKSHMANA KUMAR YERNENI

Designation : Scientist D

Date of Birth : 26th November 1958

Address (Off) : INSTITUTE OF PATHOLOGY
(Indian Council of Medical Research)
SAFDARJANG HOSPITAL CAMPUS,
P O BOX. 4909
NEW DELHI – 110029.

E mail address : yernenilk@icmr.org.in

Discipline : Cell Biology

Educational Qualifications:

Ph.D	Pharmaceutical Toxicology	1988
NET (CSIR) for JRF and Lecturership	Life Sciences	1984
M.Sc.	**Cell Biology**	1983
B.Sc.	Honours in Zoology	1979

Employment Details:

- Research Officer, Institute of Pathology, New Delhi 1996-2001
- Scientist C (Senior Research Officer), Institute of Pathology, New Delhi 2001 - 2007
- Scientist D, (Asst. Director) Institute of Pathology, New Delhi 2007 – To date

Field of Specialization:

1. Pigment Cell Biology:
2. Mycoplasma surveillance in Cell Culture:
3. Bioengineering of skin:

Research Experience:

1. Technology development for growing cultured epidermal autograft from human keratinocyte stem cells suitable for autologous grafting in burns patients.
2. Bio-Engineering of skin using a synthetic polymer as scaffold.
3. Evaluation and utilization of a guinea pig model useful for screening new therapeutic regimen in vitiligo.
4. Melanoma model in C57 mice.
5. Mycoplasma contamination in Cell culture: The quality control issues.

Research Techniques employed:

Cell and Molecular Biology –

Cell and Tissue culture, Bioengineering of skin using scaffolding polymers,

Microbial culture methods (Mycoplasma),

Karyotyping,Histological, immunocyto & histological and immunofluorescent methods,

In Vitro quantification assays for cell proliferation by BrdU labeling, cells expressing specific marker.

Quantification of biomolecules by spectrophotometry,

Electron Microscopy - Scanning and Transmission.

Affinity Chromatography, PAGE & SDS-PAGE, (protein purification),

PCR & agarose gel electrophoresis, RT-PCR & Western Blot

Small animals experimentation – Drug Toxicity evaluation in mice, Pigmentation (vitiligo) experiments in colored guinea pigs, induction of melanoma in C57 mice using B16 murine melanoma cell line.

Guidance for thesis work:

1. Supervisor for thesis work of a student for M.S. (Biomedical science) BITS, Pilani. The thesis was entitled "A guinea pig model for the therapeutic evaluation of treatment modalities in vitiligo".

2. One student was awarded Ph.D with thesis entitled "Development and application of a protocol for detection, prevention and elimination of Mycoplasma contamination in cell cultures.

3. One student with the proposed research title of "A study on differential growth-arrest of 3T3 Fibroblasts used as Feeders for Stem cell Propagation" is currently registered with BITS, Plilani.

4. One student with the proposed research title of "Evaluation of epithelial-mesenchymal interactions using differentially growth-arrested Feeder cells to cultivate human epidermal keratinocytes" is currently registered with Jiwagi University, Gwalior.

Teaching:

Teaching faculty of BITS, Pilani off-campus courses:

1. Teaching faculty for M.S. (Biomedical Sciences), an integrated PG-Ph.D course for 5 academic years.

2. Teaching faculty for Ph.D course-work and examiner for 13 academic years.

Extra-Mural Research Projects Sanctioned to date:

1. *In vitro* cultivation of differentiated epidermis from human keratinocytes suitable for autologous grafting in burns patients. (2000)
2. Clinical application of autologous cultured human epidermis in burns patients**.** (2004)

3. Cell culture contamination with mycoplasma in basic and applied biomedical research. (2005)
4. Investigation into the utility of a patented synthetic thermo-reversible hydrogel polymer as supportive matrix towards the development of 3-D composite skin for application in wound healing and other dermatological disorders (Ongoing). (2007)
5. A novel arithmetic approach for fool-proof production of growth arrest in 3T3 cells suitable for human epidermal culture (Sanctioned 2010).

Awards:

1. Received Shri Shyam Lal Saksena Memorial Award (2006) in the field of **Bio-Medical Engineering** by the NAMS [National Academy of Medical Sciences (India)]. The award was presented at the 46th Annual Convocation of NAMS, held at National Institute of Nutrition, Hyderabad, on 28th October 2006.

2. Awarded WHO In-country Fellowship in the field of study of 'Research Methodology' at the **N**ational **I**nstitute of **C**holera and **E**nteric **D**iseases, Kolkata between 8th and 21st November 2004.

Foreign Visits:

1. Presented a paper entitled "Evaluation of a guinea-pig model for its usefulness as an animal model for pre-clinical drug trials in vitilitgo" at the XVIII International Pigment Cell Conference (IPCC) held at Egmond Aan Zee, The **Netherlands**, 9 – 13th September 2002.
2. Presented a paper entitled "Mycoplasma contamination in cell culture laboratories: An Indian Perspective" at the 16th International Organization for Mycoplasmology (IOM) Congress 9th July to 14th July 2006, St. John's college, **Cambridge**, UK. (Nominated for Harry Morton Award for best poster presentation).
3. Visited the clean room facility of Prof.Sheila McNeil, Tissue Engineering Lab, Kroto Institute, University of Sheffield, North Campus, Sheffield, UK, in 2006.

Publications:

1. LK Yerneni, T.Guha. (1994) Cisplatin-induced shape transformations in mouse erythrocytes. JBAB, 2 (4), 51-53.

2. LK Yerneni, T Guha and B Iyengar. (1995) Cisplatin induced damage to testis: light and scanning electron microscopic study. JBAB, 3 (1),13-18.

3. LK Yerneni and B Iyengar. (1996)G2 Phase dependant UV-induced dendricity and levels of dopa oxidase and other macromolecules in a murine melanoma cell line. Pig Cell Res 9 (4) part 2.

4. LK Yerneni and B Iyengar. (1996) The growth cycle phases and pigmentation status of hair follicles in Vitiligo. In: Growth Disorders of pigment cell Ed.B Iyengar and AV Singh, BI Churchill Livingstone, New Delhi. 90-99

5. LK Yerneni, B Iyengar and S Jayaraman. (1997) Treatment of melanoma with melatonin. Melanoma Res. 7 (Suppl.): S123.

6. Ashok kumar, SP Bajaj, A.Mukherjee and LK Yerneni (2001) In vitro cultivation of differentiated epidermis from human keratinocytes suitable for autologous grafting in burns patients. Ind J Burns, 9 (May): 65-68.

7. M.Yadav and LK Yerneni 2002. Evaluation of a guinea-pig model for its usefulness as an animal model for pre-clinical drug trials in vitilitgo. Pig Cell Res 15 (Suppl.9) 45.

8. LK Yerneni and S.Jayaraman (2003) Pharmacological action of high doses of melatonin on b16 murine melanoma cells depends on cell number at the time of exposure. Melanoma Res **13**: 113 –117,

9. Ashok Kumar, Arif Ali and L. K. Yerneni (2007): Effectiveness of mycoplasma elimination reagent on a hybridoma cell line with lab acquired extensive mycoplasma contamination. Hybridoma **26**: 104-6.

10. Ashok Kumar, Arif Ali and L. K. Yerneni (2008) Tandem use of immunofluoresce and DNA staining assays to validate nested PCR detection of mycoplasma. *In Vitro Dev Biol Anim* **44***: 189-192.*

11. Ashok Kumar and L. K. Yerneni (2009) Semi-automated relative quantification of cell culture contamination with mycoplasma by Photoshop-based image analysis on Immunofluorescence preparations. Biologicals **37**:55-60

12. **Patent**: (Filed)

L K Yerneni and Ashok Kumar (2009) **A culture system for the growth of Stem Cells.**